

REMARKS

The applicants have given the Final Office Action mailed March 22, 2004 careful consideration. Claims 1-24 remain in the application. Reconsideration of the application is hereby respectfully requested.

The Office Action

Claim 1 was rejected under 35 U.S.C. §112, second paragraph.

Claims 15, 18-20 and 23-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,866,917 to Suzuki in view of U.S. Patent No. 5,959,731 to Jones.

Claims 16-17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki and Jones and further in view of U.S. Patent No. 3,778,214 to Wyeth.

Claims 1-14 and 21-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki in view of Jones and Wyeth.

The Present Application

The present application relates to an apparatus and method for inspecting multi-layer plastic containers or other items. More particularly, one embodiment of the invention relates to an apparatus and method whereby optical energy absorbing compounds are added to materials which comprise the layers of the item to facilitate inspection thereof. The invention allows for determination of attributes of each of the layers by virtue of individual layers containing optical-absorbing compounds that act in the near IR, or non-visible, wavelength range. In this way, individual layers can be inspected based on a variety of different criteria. In at least one embodiment, the inspections are accomplished simultaneously while the item under inspection, and its multiple layers, are disposed within an inspection zone of a machine vision system.

The Cited Art

Suzuki relates to a method and apparatus for evaluating the layer thickness of a photoreceptor having a plural number of layers layered on a conductive substrate formed thereon. It also ostensibly relates to a method and an apparatus for manufacturing photoreceptors. Notably, Suzuki does not relate to multi-layered containers and does not fairly teach a high-speed machine vision environment.

Moreover, as recognized by the Examiner, Suzuki does not teach that the item being evaluated is between a light source and a detector.

Jones relates to techniques and systems for characterizing aspects of semiconductor wafers, and more specifically, to an optical micrometer based on absorption and interference of optical beams. Notably, the Jones patent teaches away from the use of optical methods such as light reflectance and interference to measure dimensions of a workpiece. Jones indicates that these devices usually are not suitable for measuring thin wafers. (column 2, lines 3-6.) Moreover, Jones does not show inspection of multi-layer containers, nor does it fairly teach a high-speed machine vision environment.

The Wyeth patent is cited by the Examiner for its teaching of a container having a plurality of polymer layers.

The Claims Patentably Distinguish Over the Cited Patents

The Examiner rejected the claims as being obvious over various combinations of Suzuki, Jones and Wyeth. However, as will be more specifically set forth below, it is submitted that the suggested combinations of these patents do not render the claims obvious.

The Examiner rejected claims 15, 18-20 and 23-24 as being unpatentable over Suzuki in view of Jones. However, the teachings of these patents are not combinable. More particularly, the Suzuki patent relates to a technique for evaluating the thickness of layers of a photoreceptor. The photoreceptor is not completely transparent in the described teachings. The use of reflected light is used in the process. Presumably, if this device did not use reflected light, the light detector would not be able to adequately detect, as contemplated, because the photoreceptor would block the radiation. It is not apparent that any other configuration, e.g., a configuration having the inspected item between a light source and a detector, is desired in Suzuki. On the other hand, Jones shows an item being analyzed between the light source and detector; however, it is submitted that Jones teaches away from the use of reflected light, e.g., at column 2, lines 3-6. Therefore, these patents are not combinable.

Moreover, it should be noted that claim 15 is drafted in means-plus-function format. Therefore, 35 U.S.C. §112, paragraph six, must be considered by the Examiner and the specification of the present application must be considered in

interpreting this claim. For example, the means for disposing items between the sensing means and generating means must be interpreted in light of the specification. For example, the specification indicates, in at least one embodiment, that the disposing means includes mechanisms that are operative to move the items into an advantageous position between the sensor device and the source, e.g., into an inspection zone of a machine vision environment.

As noted, the suggested combination fails. However, even if Suzuki and Jones could somehow be combined, at least these disposing means features would not fairly result. Jones makes no similar reference to a conveyance of items, or machine vision type system. Suzuki only makes general reference to a feedback of data, but does not fairly suggest the system as clearly disclosed in the specification. Therefore, for at least these reasons, claim 15 should be allowed.

Claims 18-20 and 23 all depend from claim 15. Therefore, these claims are likewise allowable.

Claim 24 is also allowable. Again, the combination of Jones and Suzuki cannot fairly be made in this case. Therefore, the deficiency of Suzuki noted by the Examiner, i.e., that it does not explicitly teach that the item is positioned between the light source and the detector, is not cured. Therefore, for at least this reason, the claim is allowable.

The Examiner also rejected claims 16 and 17 under 35 U.S.C. §103 as being unpatentable over Suzuki, Jones and Wyeth. The Suzuki and Jones combination fails as noted above. Moreover, the Wyeth patent is not fairly combinable with the other two cited patents. As previously argued, Wyeth simply teaches that multi-layer bottles exist. One of skill in the art attempting to implement the system as suggested would not look to Wyeth to determine the manner in which multiple layers in a bottle can be inspected by using optical absorbing additives and non-visible radiation in a machine vision environment.

Last, the Examiner rejected claims 1-14 and 21-22 as being unpatentable over the combination of Suzuki, Jones and Wyeth. However, for the reasons stated above, these combinations are improper. Therefore, the claimed rejection should be removed.

Moreover, with respect to claim 1, even if this combination could somehow be made, the step of selectively adding optical absorbing compounds acting in the non-visible wavelength range to a plurality of polymer layers for the purpose of

determining the attributes of individual layers based on sensing non-visible electromagnetic radiation is not fairly taught. Therefore, for at least these reasons, claim 1 and all claims dependent thereon are submitted to be allowable.

With respect to claim 4, even if the improper combination could somehow be made, the suggested combination does not fairly result in an analysis of attributes of individual layers of the container based on a presence of selectively absorptive dyes within selected layers. In addition, the combination does not include the part detection, tracking and conveyance means as claimed and disclosed in the present application (e.g., elements 108, 110 and 112 of Figure 4). Therefore, for at least these reasons, claim 4 is allowable. Likewise, all claims dependent thereon are allowable.

Non-Art Rejections

The Examiner rejected claim 1 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim subject matter which applicant regards as the invention. An amendment has been made to claim 1 to overcome the rejection. Therefore, it is submitted that the claim is now in condition for allowance.

CONCLUSION

In view of the foregoing amendments and comments, all claims are submitted to be in condition for allowance. Early notification of such allowance is hereby respectfully requested.

Respectfully submitted,

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